

Near Earth Asteroid Scout (NEA Scout)

Active Technology Project (2014 - 2025)



Project Introduction

Near-Earth Asteroid Scout, or NEA Scout, is a 6U CubeSat developed jointly between NASA's Marshall Space Flight Center and the Jet Propulsion Laboratory. NASA selected NEA Scout as a candidate secondary payload for Artemis 1, the first integrated (uncrewed) flight test of the Space Launch System and Orion Crewed Spacecraft. The NEA Scout mission is funded by the Advanced Exploration Systems Division of the Human Exploration and Operations Mission Directorate.

NEA Scout is a robotic reconnaissance mission that will fly by and return data from a near Earth asteroid. NEA Scout will deploy its main propulsion system, a solar sail, that will be used in conjunction with its other on-board systems to provide stable pointing for both science and optical navigation as well as for slewing and navigating the spacecraft to its predetermined destination.

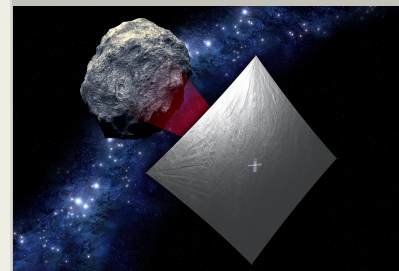
The NEA Scout team is currently evaluating a range of targets, and is continually updating the candidate pool based on new discoveries and expected performance. Because asteroids that can be reached change with launch dates, the NEA Scout team maintains a list of suitable targets over a range of launch dates, with the current planned target being 2019 GF1. The primary instrument payload will be a visible camera to image and collect data regarding the physical properties of a candidate NEA. The full science success criteria entail flying by a near Earth asteroid and acquiring images sufficient to determine its physical properties, namely, ephemeris, albedo, shape/volume, rotational properties, debris/dust field in the local environment, and regolith characteristics.

The data collected will help fill Strategic Knowledge Gaps (SKG's) related to asteroids as a precursor to subsequent safe and successful human missions.

Near-Earth asteroids (NEAs) are of interest not only for Human exploration, but also for science, in situ resource utilization, and planetary defense. The data to be returned by NEA Scout is pertinent to all four areas.

Anticipated Benefits

A solar sail will provide the primary propulsion for the NEA Scout mission. Solar sails provide a new capability for delivering science payloads to a variety of planetary bodies, the outer solar system, non-Keplerian orbits (where propulsive acceleration acts in addition to that of the effects of gravity), or high-inclination orbits (e.g., solar polar orbit). Using the continuous low thrust provided by a solar sail, spacecraft can achieve DV's that are impossible to obtain using chemical or even solar electric propulsion. As the technology matures, solar sails will increasingly be used to enable science and exploration missions that are currently impossible or prohibitively expensive using traditional chemical and electric rockets.



Conceptual Design of NEA Scout Mission

Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Images	3
Technology Areas	3
Target Destination	3
Supported Mission Type	3
Project Website:	4

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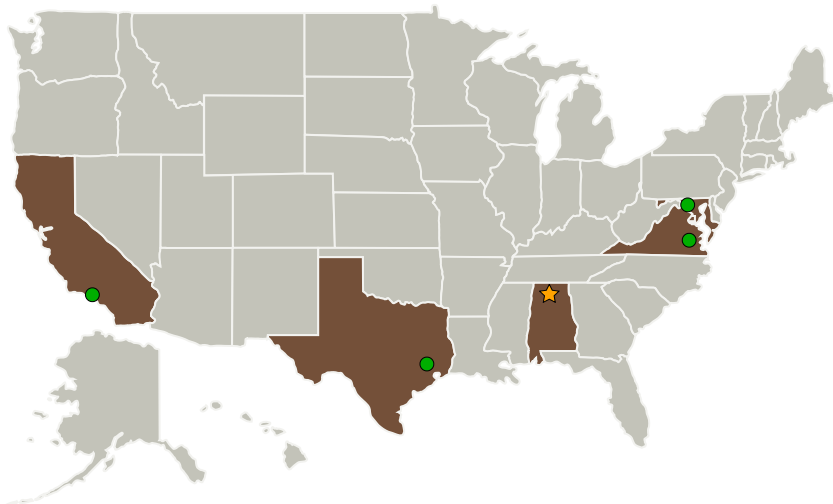
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The new camera system, avionics, and solar sail designed and developed by the NEA Scout project for a robotic mission to a planetary body can enable future commercial development of CubeSat class payloads. Industry and other government agencies with the need to fly small robotic spacecraft beyond Earth orbit and/or deorbit spacecraft from LEO can benefit from the use of solar sails: solar sails provide a highly efficient method to provide thrust and perform a wide range of advanced maneuvers, such as to hover indefinitely at points in space or conduct orbital plane changes more efficiently than conventional chemical propulsion.

Large-area deployable technology such as the NEA Scout solar sail can also be repurposed for use as solar shields, providing a low-mass solution for passively cooling scientific instruments or propellant during long duration missions.

Primary U.S. Work Locations and Key Partners



Organizational Responsibility

Responsible Mission Directorate:

Exploration Systems
Development Mission
Directorate (ESDMD)

Lead Center / Facility:

Marshall Space Flight Center
(MSFC)

Responsible Program:

Exploration Capabilities

Project Management

Program Director:

Christopher L Moore

Project Manager:

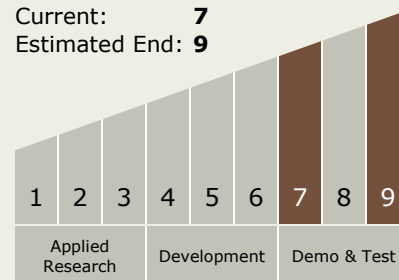
James E Stott

Principal Investigators:

Julie C Castillo
Charles L Johnson

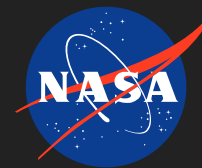
Technology Maturity (TRL)

Start: 7
Current: 7
Estimated End: 9



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Organizations Performing Work	Role	Type	Location
★ Marshall Space Flight Center (MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
● Goddard Space Flight Center (GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland
● Jet Propulsion Laboratory (JPL)	Supporting Organization	NASA Center	Pasadena, California
● Johnson Space Center (JSC)	Supporting Organization	NASA Center	Houston, Texas
● Langley Research Center (LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.4 Advanced Propulsion
 - └ TX01.4.1 Solar Sails

Target Destination

Others Inside the Solar System

Supported Mission

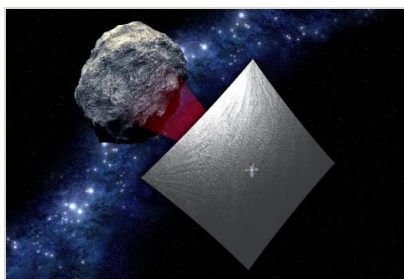
Type

Planned Mission (Pull)

Primary U.S. Work Locations

Alabama	California
District of Columbia	Maryland
Texas	Virginia

Images



NEA Scout Mission Concept

Conceptual Design of NEA Scout Mission

(<https://techport.nasa.gov/image/143300>)

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Project Website:

<https://www.nasa.gov/content/nea-scout>